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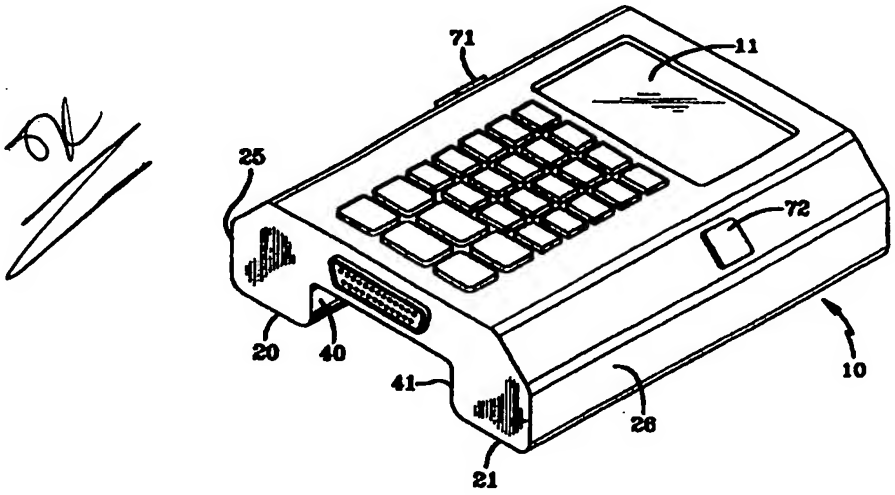
(54) Title: EDGE-GRIP APPARATUS FOR HANDHELD DEVICES



(57) Abstract

A handheld device (10) for portable data entry held in a user's single hand (30) includes one or more handle-bar apparatus (20, 21) on opposing sides of the back of the device (10) such that the user's fingers (31) wrap around the outer edge (25, 26) and the front panel (11) of the device (10), the inner side (40, 41) of the handle-bar (20, 21) is gripped by the thumb (32), and the device (10) is further supported on the bottom panel (37) by the palm (33) and wrist of the hand (30). A device (10) having handle-bar apparatus (20, 21) is particularly suited for one-handed scanning by adding a scanner (70), and scanning trigger buttons (71, 72) located on the outer edge (25, 26) of the handheld unit (10).

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EDGE-GRIP APPARATUS FOR HANDHELD DEVICES

REFERENCE TO COPENDING APPLICATION

This application claims the benefit of United States Provisional Application Serial No. 60/012,013 filed February 21, 1996.

TECHNICAL FIELD

The present invention relates in general to processor based devices operable while being held in its user's hand, such as a handheld computer and a handheld scanner. More particularly, the present invention pertains to the structure of such handheld devices allowing for hand holding during operation. More specifically, the present invention relates to hand gripping structure for such handheld devices.

BACKGROUND ART

There are several handheld computing and one-handed scanning devices which have a narrow portion to help the user grip the device in one hand while scanning automatic identification tags such as bar codes. One example of such a device is described in U.S. Patent No. 4,621,189 (KUMAR et al.). Such devices are comfortable for handheld scanning and handheld key entry for which they were designed. However, because of the narrow grip portion, they do not have an ample front panel area which many applications require in order to accommodate a larger keyboard size and/or a larger display size.

A new class of products, generally referred to as pen-based computers, do provide a larger display area, but are not comfortably and securely held during active use such as for portable data collection. Also, they are not suited for one-handed scanning because their large width makes them difficult to hold in the scanning position in one hand.

There are other devices, such as the Model LRT 4600 from Symbol Technologies of Holtsville, New York, which have a large front panel display and also have a

narrow bottom portion for a more comfortable grip during one-handed scanning. These devices do not allow the user's fingers to wrap around any structure while holding the device, thereby preventing a secure grip. Also, such devices tend to be unstable when operated on a desk top because of their narrow base and wide top.

Another portable data entry device, described in U.S. Patent No. 5,059,788 (ZOUZOULAS et al.), provides a comfortable grip and a somewhat larger area for display and keyboard compared to the narrow grip-held devices described above (KUMAR et al.). Unfortunately, this device is not well balanced because of having most of its weight in the front. It also loses a significant part of the front panel area to the grip which itself is in the front.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide an apparatus for comfortable and secure single-handed operation of a processor-based handheld device such as handheld computer and a handheld scanner.

It is another object of the present invention to provide an apparatus, as set forth above, which does not limit the size of any display or key input area that is part of the handheld device.

It is still another object of the present invention to provide an apparatus, as set forth above, that allows a user's fingers to be wrapped at least partially thereabout for additional security during operation and greater comfort during extended periods of operation.

It is yet another object of the present invention to provide an apparatus, as set forth above, that may be placed and operated upon a desktop with stability.

These and other objects and advantages of the present invention over existing prior art forms will become more apparen: nd fully understood from the following description in conjunction with the accomp..iying drawings.

In general, an apparatus in accordance with the present invention for comfortable and secure single-hand gripping of a handheld device having at least two sides, includes a first means for single-hand gripping by wrapping a plurality of fingers thereabout, the first means for single-hand gripping securable to a first side of the handheld device; and a second means for single-hand gripping by wrapping a plurality of fingers thereabout, the second means for single-hand gripping securable to a second

side of the handheld device, the first means for single-hand gripping and the second means for single-hand gripping forming a recess therebetween for receiving the user's thumb.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a top perspective view of an exemplary handheld device including exemplary handle-bar apparatus in accordance with the present invention.

Fig. 2 is a bottom perspective view of the exemplary handheld device shown in Fig. 1.

Fig. 3 is an end elevational view of the exemplary handheld device shown in Fig. 1 held in a user's hand with certain of the user's fingers wrapped around an exemplary handle-bar apparatus in an orientation typical for data entry.

Fig. 4 is a front elevational view of the exemplary handheld device shown in Fig. 1 including a scanner mounted atop an end of the device. The device is shown held in a user's hand with certain of the user's fingers wrapped around the exemplary handle-bar apparatus in an orientation typical for scanning.

Fig. 5 is a rear elevational view of the exemplary handheld device shown in Fig. 1 in the orientation depicted in Fig. 4.

Fig. 6 is an end elevational view of a PRIOR ART handheld device.

Fig. 7 is a top perspective view of an exemplary handheld device including an additional exemplary embodiment of handle-bar apparatus in accordance with the present invention.

Fig. 8 is bottom perspective view of the exemplary handheld device shown in Fig. 7.

PREFERRED EMBODIMENT FOR CARRYING OUT THE INVENTION

An exemplary handheld device for portable data entry, scanning, and computing, generally indicated by the numeral 10 in Fig. 1, has a front panel 11 which is large enough to accommodate larger displays such as those found on pen-based computers. Previously, this would make the device too large to be comfortably and securely held in one hand during portable operation. This drawback — common to such devices traditionally — is overcome by providing, in a first exemplary embodiment, substantially cylindrical shaped handle-bar apparatus 20, 21 on back of the unit on two

opposite edges 25, 26, as shown in Figures 1 and 2. In this way the outer edges of handle-bars 20, 21 line up with the outer edge 25, 26 of the handheld unit 10.

As best seen in Figure 3, to hold the device in one hand 30, the fingers 31 of the hand grip one of the outer edges 25, 26 and the front panel 11 of the handheld unit 10 by wrapping thereabout. The thumb 32 of the hand grips the inner side 40, 41 of the handle-bar 20, 21 around which the fingers are wrapped and the palm 33 of the hand supports the bottom panel 37 of the handheld unit 10. The bottom panel 37 of the handheld unit 10 must be recessed relative to the bottom surface 45, 46 of the handle-bars 20, 21, thereby providing a secured and comfortable grip by the thumb 32. Device 10 is further balanced by being supported on the bottom panel 37 by the palm 33 and the wrist of the hand, unlike that of a representative prior art configuration as show in Figure 6.

Several modifications within the spirit of the present invention now should be evident to the skilled artisan. For example, there are several ways of forming handle-bars 20, 21, in addition to that already illustrated in Figures 1, 2 and 3 and described above. Another method of forming handle-bars is to provide, and secure in any manner as may occur to one of ordinary skill in the art, separate handle-bar apparatus 60, 61 on the opposing sides and towards the back of handheld device 10, as shown in Figures 7 and 8. As with the embodiment depicted in Figures 1, 2 and 3, handle-bars 60, 61 are placed such that: fingers 31 of the hand 30 wrap around the front panel 11 and the outer edges 25, 26 of the handheld unit 10; the inner side 40, 41 of the handle-bar 60, 61 is gripped by the thumb 32 of the hand 30; and device 10 is further supported on the bottom panel 37 by the palm 33 and wrist of the hand.

The apparatus 20, 21 of the present invention can be employed with a handheld device 10 adapted for one-handed scanning applications by adding a scanner 70 at the top-end of the handheld device 10 and by adding a trigger-button 71, 72 on the outer edge 25, 26 of device 10, located where it can be actuated by one of the fingers 31 or the thumb 32 of the hand — preferably the index finger, as illustrated in Figures 4 and 5. Two identical connectors 80, 81, are oriented 180° from each other, on the top-end of the device, as shown in Figure 2. The scanner 70 is plugged into the connector 80, 81 closest to the object to be scanned when the device 10 is held for scanning in one hand. In this fashion, the device 10 provides right-handed scanning (as shown in Figures 4 and 5) and left-handed scanning capabilities.

Inasmuch as the present invention is subject to variations, modifications and changes in detail, some of which have been expressly stated herein, it is intended that all matter described throughout this entire specification or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. It should thus be evident that a device constructed according to the concept of the present invention, and reasonably equivalent thereto, will accomplish the objects of the present invention and otherwise substantially improve the art of furnishing apparatus for comfortable and secure single-handed gripping and operation of a processor-based handheld device.

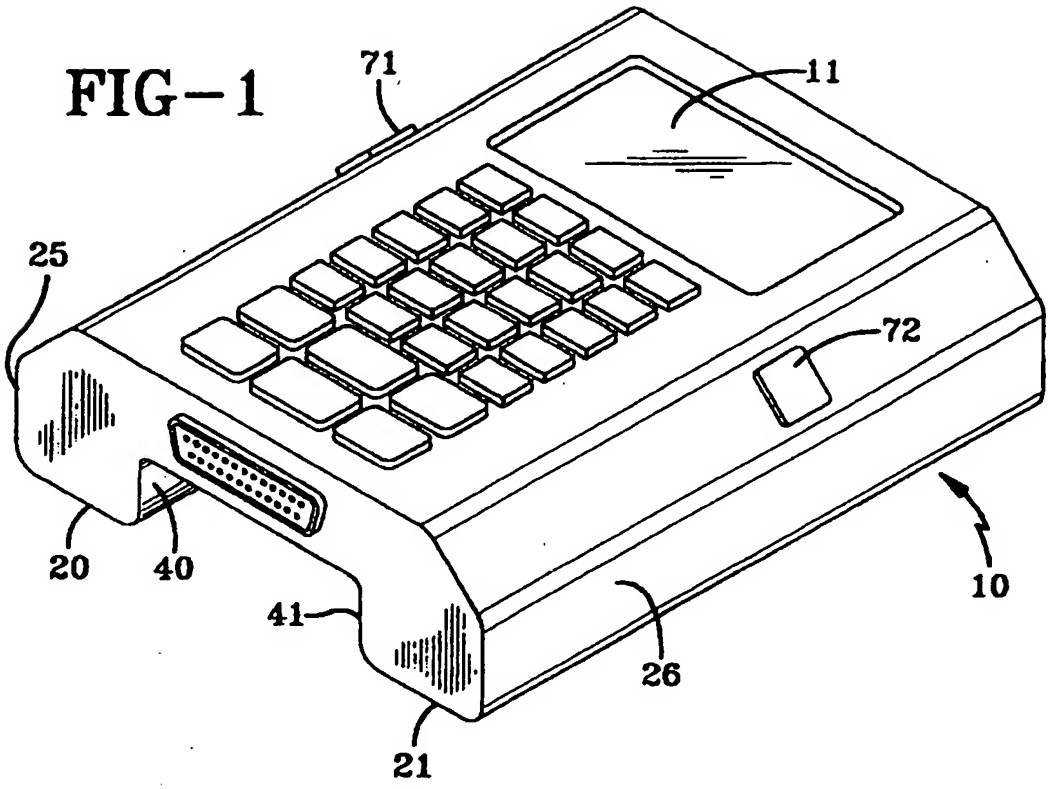
CLAIMS:

1. Apparatus for comfortable and secure single-hand gripping of a handheld device having at least two sides, comprising: a first means for single-hand gripping by wrapping a plurality of fingers thereabout, said first means for single-hand gripping securable to a first side of the handheld device; and a second means for single-hand gripping by wrapping a plurality of fingers thereabout, said second means for single-hand gripping securable to a second side of the handheld device, said first means for single-hand gripping and said second means for single-hand gripping forming a recess therebetween for receiving the user's thumb.

2. An apparatus, as set forth in claim 1, wherein said first means for single-hand gripping is a substantially cylindrically shaped handle-bar, and said second means for single-hand gripping is a substantially cylindrically shaped handle-bar.

3. An apparatus, as set forth in claim 2, wherein said first means for single-hand gripping includes a scanner button positioned for actuation by a user finger, and said second means for single-hand gripping includes a scanner button positioned for actuation by a user finger.

FIG-1



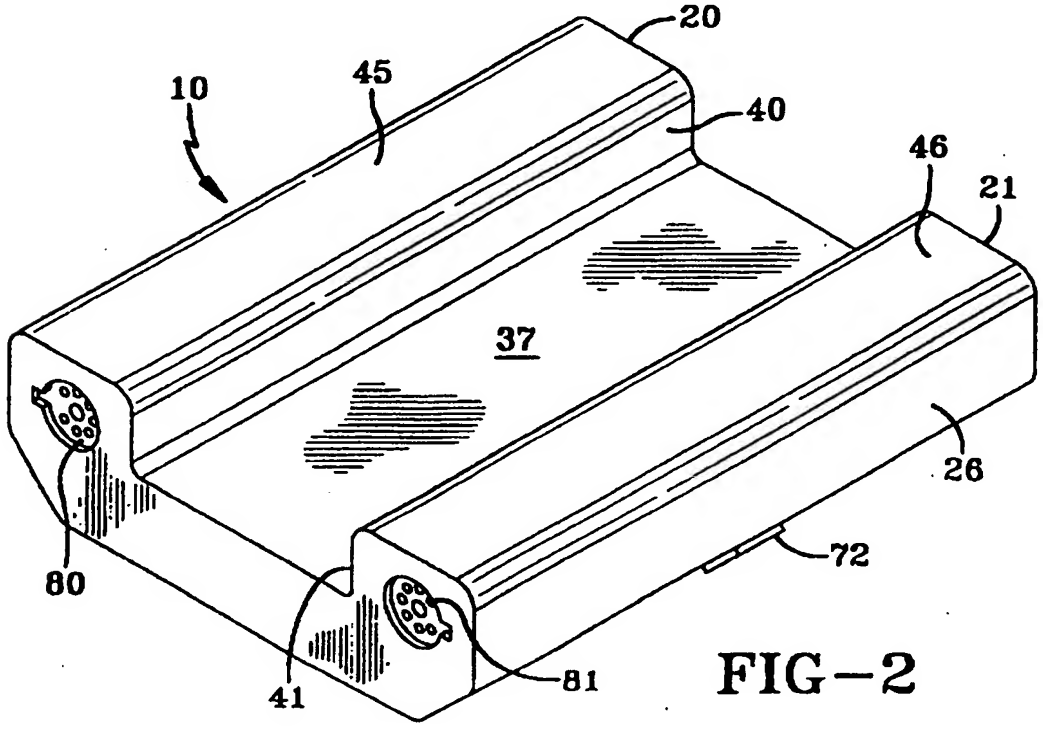


FIG-2

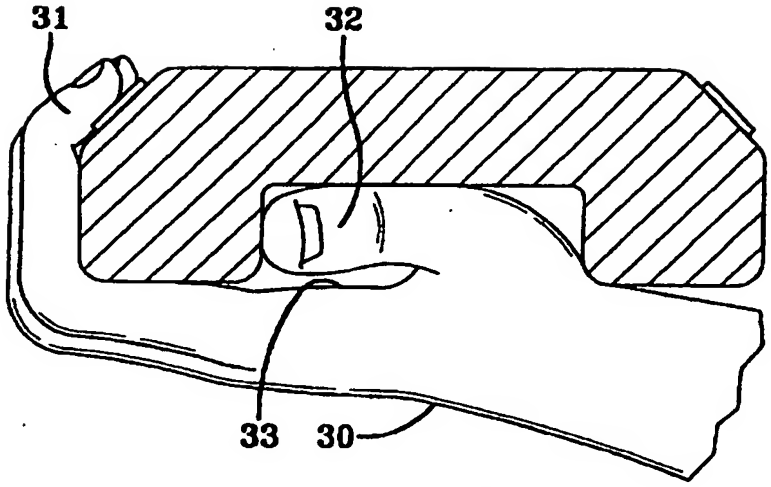


FIG-3

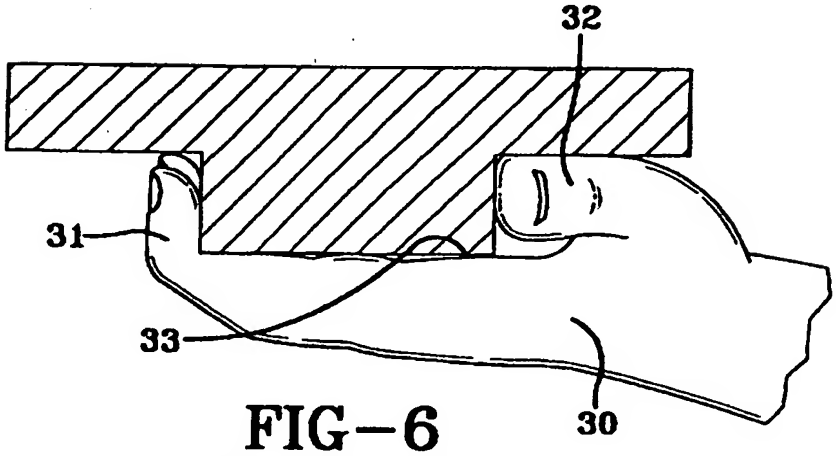


FIG-6
PRIOR ART

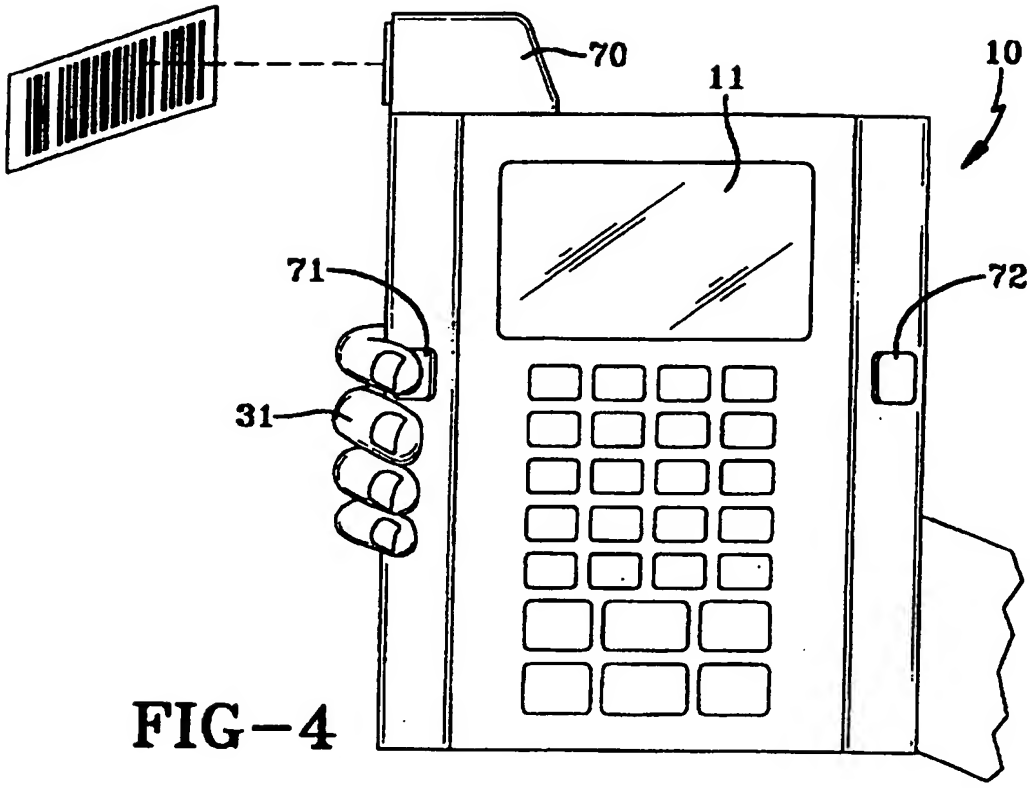


FIG-4

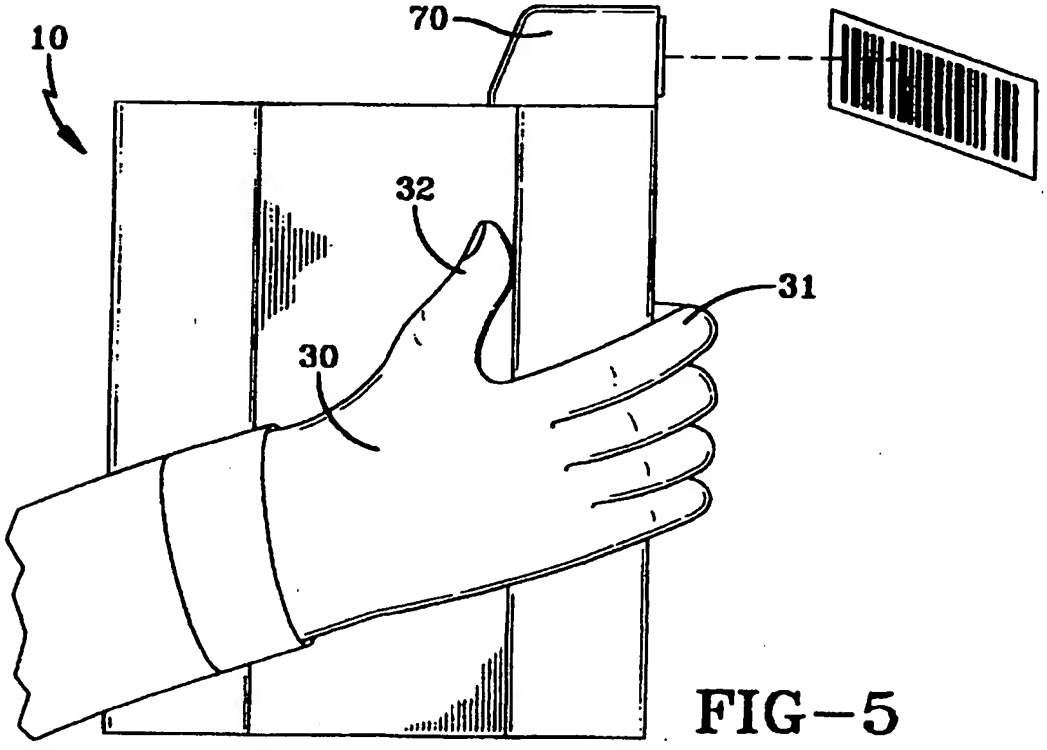
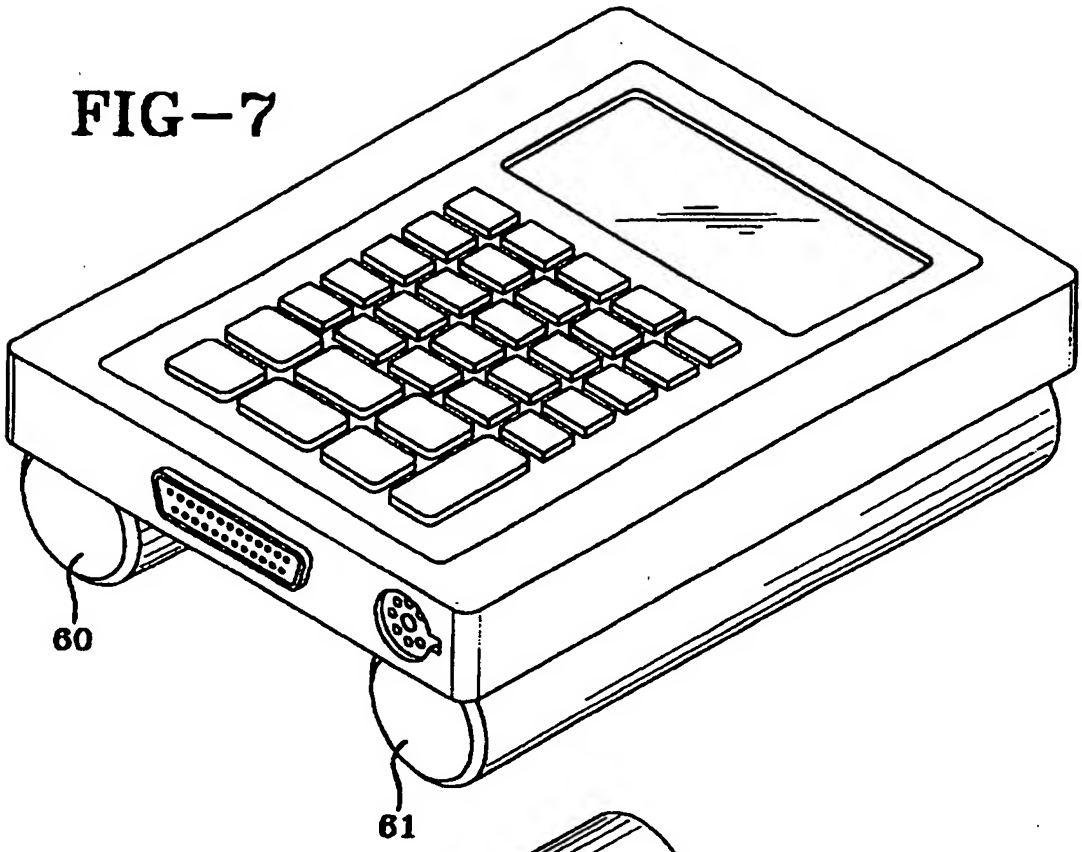


FIG-5

FIG-7



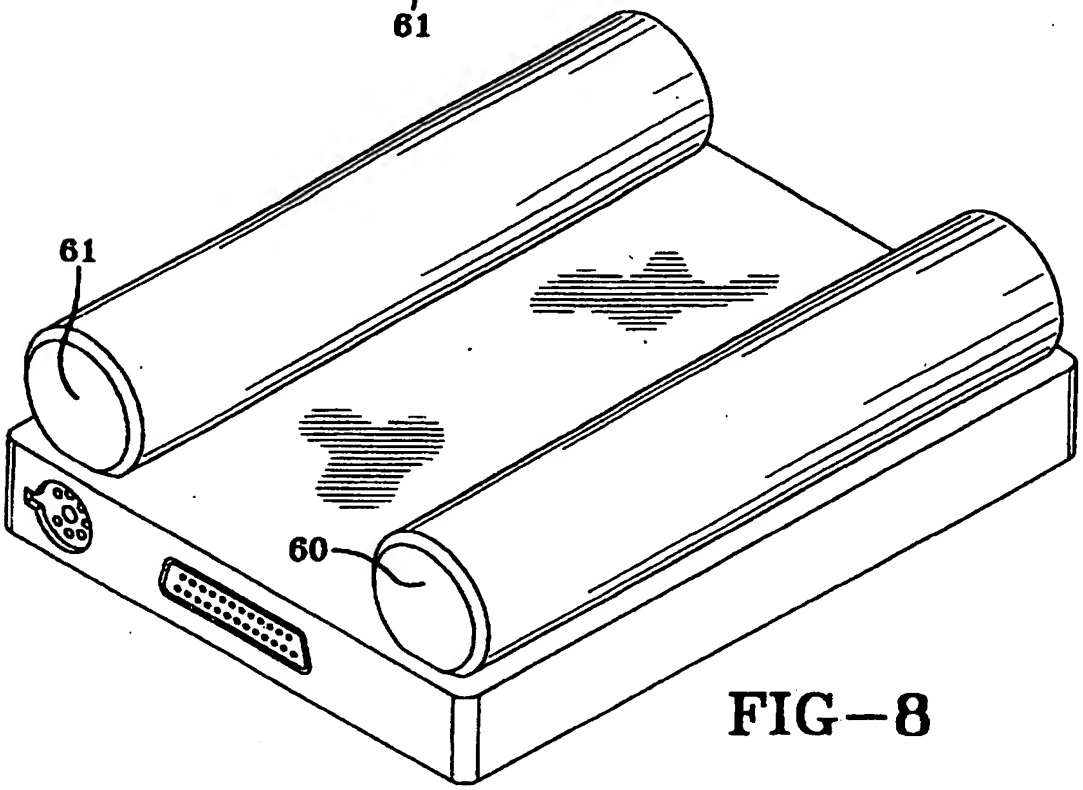


FIG-8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/02596

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06K 7/10
US CL : 235/472

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 235/472; 364/708.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

MAYA
search terms: entire disclosure

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,382,962 A (YOUNG) 17 January 1995, fig. 1.	1-2
Y		3
X	US 5,404,267 A (SILVA et al) 04 April 1995, figs. 1-3.	1-2
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☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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